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EXAMINER	
ROSENBERGER, FREDERICK F	
ART UNIT	**PAPER NUMBER**
2878	

DATE MAILED: 11/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/716,367	LACEY ET AL.
	Examiner	Art Unit
	Frederick F. Rosenberger	2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *18 November 2003*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

Priority

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows: An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). The specific reference to any prior nonprovisional application must include the relationship (i.e., continuation, divisional, or continuation-in-part) between the applications except when the reference is to a prior application of a CPA assigned the same application number.

Information Disclosure Statement

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Claim Objections

3. Claims 10, 11, and 20 are objected to because of the following informalities:

In regards to claim 10, " an array detector array" is recited in lines 1-2. In lines 4-5 and 14, said array is referred to as "the x-ray detector array."

In regards to claim 11, a positive recitation is made to "the x-ray detector device" in line 4. However, there is no positive recitation as to the construction of said device in claim 11 or the claims upon which it depends. For the purposes of this office action, "the x-ray detector device" has been interpreted to refer to the "x-ray detector array" as described in claim 10.

In regards to claim 20, the phrase "maintaining a actively" should be "maintaining an actively" in line 2.

Appropriate corrections are required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an active heat dissipating device providing an air flow to the thermoelectric cooler, does not reasonably provide enablement for the dissipation of heat produced by the controller. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims. The specifications disclose the use of a fan or other active heat-dissipating device to remove additional heat from the heat sinks to dissipate heat produced by the thermoelectric

cooler (paragraph 33). There is no disclosure in the specifications of an active heat-dissipating device to remove heat from the controller.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens in view of Yoshioka and Michaelis.

In regards to claim 1, Aikens discloses a cooled X-ray sensitive photoconductor (Figure 2) consisting of (a) a detector array **105** and (b) a thermoelectric cooler **203** coupled to the detector array **105**.

However, Aikens does not disclose a temperature sensor for monitoring the temperature of the detector, a heater coupled to the center portion of the detector, or a control device for adjusting the response of a heater to compensate for temperature variations, or control of the thermoelectric cooler by an adjustable power input.

Yoshioka teaches the practice of bonding a heater **H3** to the center portion of a detector array (Figure 2). Coupled with a temperature sensor **S3** control of the temperature of the detector **III** is possible. Yoshioka also discloses temperature control

circuits **11a-11c** for the purpose of modulating the response of the heaters to control the temperature.

It would have been obvious to a person having ordinary skill in the art to modify Aikens to include a heater at the center of the detector, a temperature sensor coupled to the detector, and a controller to modulate the heater response so as to have greater control over the temperature away from the edges of the detector array, as taught by Yoshioka.

However, the combination of Aikens and Yoshioka also does not suggest control of the thermoelectric cooler through an adjustable power supply.

Michaelis teaches a temperature controlled thermoelectric cooling system wherein a thermoelectric cooler is controlled by means of a variable power input. In Figure 1, a thermoelectric cooler **34** has a positive terminal **44** connected to a modulated power supply **22**. Michaelis further discloses that control of the temperature circuit can be affected in an on-off manner or in a continuous analog manner (column 1, lines 27-30).

Thus, it would have been obvious to a person having ordinary skill in the art to modify Aikens and Yoshioka to control the thermoelectric cooler via a variable power supply for variable temperature control at the ends of the array and flexibility in the desired temperature profile along the detector array, as taught by Michaelis.

In regards to claim 2, Yoshioka further discloses that said heater **H3** and said temperature sensor **S3** are mounted to the center portion of the detector **III** as shown in Figure 2.

It would have been obvious to a person having ordinary skill in the art to further modify the combination of Aikens, Yoshioka, and Michaelis, to include a temperature sensor at the center of the detector to enable control of the temperature at the center of the detector array, as taught by Yoshioka.

In regards to claim 3, Yoshioka teaches a temperature control circuits **11a-11c** for the purpose of modulating the response of the heaters to maintain the temperature of the array. Maintenance of the temperature of the array keeps the temperature profile of the array in a uniform state. Michaelis also teaches a control system for controlling the output of the thermoelectric cooler **34** based on the temperature of a device to be cooled **40** and its difference from a reference temperature (Figure 1 and column 2, lines 1-6).

It would have been obvious to a person having ordinary skill in the art to further modify the combination of Aikens, Yoshioka, and Michaelis to provide a uniform temperature profile along the detector array so as to minimize temperature induced noise in the acquired detector images. It would have further been obvious to employ control systems for the thermoelectric cooler, temperature sensor, and heater in a single controller device so as to enable synergy between the different thermal management systems for effective temperature control of the detector array.

In regards to claim 4, Yoshioka further suggests a temperature profile along the length of the detector array that is substantially parabolic (Figure 9).

It would have been obvious to a person having ordinary skill in the art to further modify the combination of Aikens, Yoshioka and Michaelis to include a parabolic

temperature profile along the length of the array to limit thermal mechanical shifting of the detector elements, as taught by Yoshioka.

In regards to claim 5, Aikens further discloses a heat sink **204** coupled to the thermoelectric cooler **203**, as shown in Figure 2, for the purposes of passively dissipating heat generated by the thermoelectric cooler.

Thus, it would have been obvious to a person having ordinary skill in the art to further modify the combination of Aikens, Yoshioka, and Michaelis to include a heat sink coupled to the thermoelectric cooler to increase the amount of heat dissipated by the cooler, thus minimizing the probability of meltdown of the cooler, as taught by Aikens.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Michaelis as applied to claim 1 above, and further in view of Bielinski.

The combination of Aikens, Yoshioka, and Michaelis does not suggest the use of a fan directed at the thermoelectric cooler.

Bielinski teaches a thermoelectric cooling system wherein a fan **106**, shown in Figure 7, is directed at the thermoelectric cooler **18** as a means to actively dissipate heat generated by the device.

Thus, it would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Michaelis to include a fan directed at the thermoelectric cooler for increased heat dissipation as suggested by Bielinski, thus further minimizing the risk of meltdown of the cooler.

9. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Michaelis as applied to claim 5 above, and further in view of Cotic and Altman.

In regards to claim 7, the combination of Aikens, Yoshioka, and Michaelis does not suggest the detector array being bounded by rails on either side of the detector. Nor does the combination specify the use of a conductive insert with at least one of the rails for the purpose of heat conduction.

However, Cotic clearly demonstrates in Figure 4 the use of opposing insulating rails **38** and **40** coupled to an X-ray detector array, which is composed of electrode plates **34**. Cotic is silent as to the use of a conductive insert in one of the rails to conduct heat along the detector array.

Altman discloses the use of conductive plates on opposing sides of a heat transfer element for the purposes of thermal conduction. In reference to Figures 2 and 3, the heat conductive plates **48** and **50** sit on opposite sides of a bank of thermoelectric coolers **46** yet within the walls of the overall structure **54**. Heat gradients generated by the thermoelectric coolers are conducted along the heat conductive plates and along the thermoelectric cooler array.

In regards to claim 8, Altman further discloses that the conductive plates can be of the form of a copper bar (column 3, lines 3-5 and 9-11).

It would have been obvious to a person having ordinary skill in the art to modify the combination of Aikens, Yoshioka, and Michaelis to include a rail structure with conductive inserts on the sides of the detector to increase the efficiency of heat

conduction from detector elements far from the thermoelectric coolers, in view of Cotic and Altman.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Michaelis as applied to claim 1 above, and further in view of Sasaki et al.

The combination of Aikens, Yoshioka, and Michaelis does not suggest the use of an insulating cover around the bottom, sides, and ends of the detector assembly.

Sasaki et al. disclose an X-ray CT radiation detector including a case **17**, shown in Figure 2. The case **17** is composed of a housing **19** and a heat insulator **21** covering the outer surface of the housing (column 3, lines 39-45). As is evident from Figures 2 and 3, the case encloses the detector on the sides, bottom, and ends, but is left open at the top to allow for an X-ray window **16**.

It would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Michaelis to include insulation around the sides, bottom, and ends of the detector assembly to minimize temperature fluctuations and environmental disturbances, as taught by Sasaki et al.

11. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens in view of Yoshioka and Morris et al.

In regards to claim 10, Aikens discloses a method and apparatus comprising coupling a thermoelectric cooler **203** to each end of the X-ray detector **105**, as shown in Figure 2.

Aikens does not discloses the other aspects of the claimed invention, including a method for selecting an operating temperature, for sensing an actual temperature at a center portion and end portion of the detector array, for providing a heater to control the temperature of the center portion, for controlling the thermoelectric controller and the heater based on the difference between set and measured temperature readings to maintain a temperature profile along the detector, and for using a thermoelectric cooler in either a heat or cool mode.

In Figure 2, Yoshioka discloses a method and apparatus for a multi-element X-ray comprising (a) sensing an actual temperature of the detector array **I-III** at each of a center portion **III** and an end portion **I** or **II** through the use of temperature sensors **S1-S3**, (b) providing a heater **H3** to control the temperature of the center of the array, and (c) comparing the sensed temperature to the desired temperature and adjusting the heat output of the heaters through control circuits **11a-11c** to maintain the set temperature.

Thus it would have been obvious to a person having ordinary skill in the art to modify Aikens in view of Yoshioka to use a method including a heater and temperature sensor at the center of the array along with a temperature sensor at the edge of the array to enable control of the temperature at both the center and edges of the array. However, the combination of Aikens and Yoshioka is silent as to the method for controlling the thermoelectric cooler and for using said cooler in either a heating or cooling capacity.

Morris et al. further disclose a method and apparatus for controlling temperature of a semiconductor circuit. In column 5, lines 23-27 and Figures 1 and 2, the controller **28** of the thermoelectric coolers **34** can initiate heating or cooling of the semiconductor circuit **22** by the thermoelectric coolers dependent upon the relation of the temperature as registered by the temperature sensors **54** to the setpoint.

It would have been obvious to a person having ordinary skill in the art to modify the combination of Aikens and Yoshioka to include a method employing a thermoelectric cooler that could heat or cool the detector so as to have greater control of the temperatures at the ends of the array, as taught by Morris et al.

In regards to claim 12, Aikens further discloses a method employing a passive heat-dissipating element attached to the thermoelectric cooler in the form of a heat sink (Figure 3b).

Thus, it would have been obvious to a person having ordinary skill in the art to modify the combination of Aikens, Yoshioka, and Morris et al. to include a method for passively dissipating heat from the thermoelectric cooler to prevent overheating of the thermoelectric cooler.

12. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Morris et al. as applied to claim 10 above, and further in view of Altman.

In regards to claim 11, the combination of Aikens, Yoshioka, and Morris et al. does not suggest a method comprising a heat conductive material along the length of the detector for conducting heat.

Altman discloses a method using copper rails **48** and **50** for the purpose of conducting heat along the length of an array of thermoelectric coolers **46** to a heat sink **20** or **56**, respectively.

Thus, it would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Morris et al. to include a step for coupling a heat conductor to the array for conducting heat along its length for the purpose of conducting heat away from those regions of the detector far from a heat dissipation mechanism, as taught by Altman.

In regards to claim 15, Aikens discloses a method wherein a thermoelectric cooler **203** sits at the edge of an X-ray detector **105** for the purposes of cooling the detector (Figure 2). In Figure 2, Yoshioka discloses a method wherein a temperature sensor **S1** mounted at the end of the detector array to enable temperature control of that segment.

Thus, it would have further been obvious modify Aikens, Yoshioka, and Morris et al, to employ a method using a temperature sensor and a thermoelectric cooler for the purpose of having greater control of the temperature at the ends of the array.

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Morris et al. as applied to claim 10 above, and further in view of Bielinski.

Aikens, Yoshioka, and Morris et al. do not suggest a method including a step of actively dissipating heat produced by the thermoelectric cooler.

Bielinski discloses a method and apparatus for a thermoelectric cooling system, wherein a fan **106**, shown in Figure 7, is directed at the thermoelectric cooler **18** as a means to actively dissipate heat generated by the thermoelectric cooler.

It would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Morris et al. to include a step for actively dissipating heat produced by the thermoelectric cooler via a fan for increased heat dissipation, as taught by Bielinski.

14. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, and Morris et al. as applied to claim 10 above, and further in view of Sasaki et al.

Aikens, Yoshioka, and Morris et al. do not suggest a method for insulating the detector array.

Sasaki et al. disclose a method and apparatus for an X-ray CT radiation detector including a case **17**, shown in Figure 2. The case **17** is composed of a housing **19** and a heat insulator **21** covering the outer surface of the housing (column 3, lines 39-45). As is evident from Figures 2 and 3, the case encloses the detector on the sides, bottom, and ends, but is left open at the top to allow for an X-ray window **16**.

It would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Michaelis to include a method of insulation around the sides,

bottom, and ends of the detector assembly to minimize temperature fluctuations and environmental disturbances, as taught by Sasaki et al.

15. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens in view of Yoshioka, Michaelis, Cotic, and Altman.

Aikens discloses a cooled X-ray sensitive photoconductor (Figure 2) consisting of (a) a detector array **105**, (b) thermoelectric coolers **203** coupled to the edges of the detector array, and (c) a passive heat dissipating device in the form of a heat sink **204** connected to the thermoelectric coolers.

Aikens does not disclose a heater directed at the center of the detector, a plurality of temperature sensors along the length of the array, or a control device for monitoring the temperature sensors and controlling the heater and thermoelectric coolers based on the temperature measurements.

Yoshioka teaches the practice of bonding a heater **H3** to the center portion of the detector array (Figure 2). A plurality of temperature sensors **S1-S3** is spaced along the detector array, enabling monitoring of the temperature at various points along the detector array through electrically coupled controller **11a-11c**. As each temperature sensor and heater has its own control module as part of the controller assembly, individual temperatures can be set for each detector region of the array.

It would have been obvious to a person having ordinary skill in the art to modify Aikens to include a heater at the center of the detector array, a plurality of temperature sensors along the array, a control module for controlling the heater output as function of

temperature to better enable control of the temperature along the length of the array, as taught by Yoshioka. However, the combination of Aikens and Yoshioka does not teach the driving of a thermoelectric cooler through a positive and negative lead for controlling temperature.

Michaelis teaches a temperature controlled thermoelectric cooling system wherein a thermoelectric cooler is controlled by means of a variable power input through a positive terminal **44** connected to a modulated power supply **22**, the negative terminal **46** being connected to ground (Figure 1).

It would have been obvious to a person having ordinary skill in the art to modify the combination of Aikens and Yoshioka to include a control means for the thermoelectric cooler through a positive and negative lead of the cooler to simplify the control scheme and enable variable temperature control at the edges of the array, as taught by Michaelis. However, the combination of Aikens, Yoshioka, and Michaelis does not suggest first and second rails on the sides of the array with conductive inserts, and with the thermoelectric coolers coupled to those rails.

Cotic teaches the use of rails **38** and **40** to frame the arrayed elements of the detector (Figure 4), but is silent as to the use of conductive inserts in cooperation with said rails for conductive heat transfer. Altman teaches the use of conductive bars **48** and **50** within a housing to conduct heat along heat producing or sinking elements (thermoelectric coolers **46** in Figures 2 and 3) to a common heat dissipation region (sinks **20** or **56** in Figure 3).

Thus, it would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, and Michaelis to include rails with conductive inserts coupled to the thermoelectric coolers for increased heat conduction from the heated center of the array to heat dissipation regions at the edge of the array, as taught by Cotic and Altman.

16. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, Michaelis, Cotic, and Altman as applied to claim 16 above and further in view of Morris et al.

In regards to claim 18, the combination of Aikens, Yoshioka, Michaelis, Cotic, and Altman suggests that the thermoelectric cooler can only provide a cooling element to the detector array, not a heating element.

In regards to claim 19, the combination of Aikens, Yoshioka, Michaelis, Cotic, and Altman also does not suggest that the thermoelectric cooler can selectively provide a heating or cooling element to the detector array.

Morris et al. disclose a method and apparatus for controlling temperature of a semiconductor circuit. In column 5, lines 23-27 and Figures 1 and 2, the controller **28** of the thermoelectric coolers **34** can initiate heating or cooling of the semiconductor circuit **22** by the thermoelectric coolers dependent upon the relation of the temperature as registered by the temperature sensors **54** to the setpoint.

It would have been obvious to a person having ordinary skill in the art to modify Aikens, Yoshioka, Michaelis, Cotic, and Altman such that the thermoelectric controller

could selectively provide either a heating or cooling element to the detector array for increased control of the temperature of the ends of the array, as taught by Morris et al.

17. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aikens, Yoshioka, Michaelis, Cotic, and Altman, as applied to claim 16 above, and further in view of Yoshioka.

The combination of Aikens, Yoshioka, Michaelis, Cotic, and Altman, as described above, does not account for anything but a uniform temperature profile. However, Yoshioka further teaches a temperature profile wherein the temperature at the center of the detector can be held at a higher value than at the opposing ends of the array (Figures 3 and 9).

Thus, it would have been obvious to one having ordinary skill in the art to further modify Aikens, Yoshioka, Michaelis, Cotic, and Altman to include a temperature profile wherein the center of the detector array is hotter than the edges for the purpose of minimizing thermal mechanical shifting of the detector elements, as taught by Yoshioka.

Conclusion

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Schuh uses two separate thermoelectric coolers as a separate heater and cooler, integrated on a microelectromechanical system substrate along with a temperature sensor and detector device, to control the temperature of said detector device.

Crawford et al. disclose a CT scanning apparatus wherein the X-ray detector has a plurality of temperature sensors dispersed along its length for the purpose of temperature compensation of the resulting image.

Jensen et al. disclose a fabrication method for a graded gap semiconductor detector that achieves the graded structure via a parabolic temperature profile across the detector array during the fabrication process.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Frederick F. Rosenberger whose telephone number is (571) 272-6107. The examiner can normally be reached on 7:30 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Frederick F. Rosenberger
Examiner
GAU 2878

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800